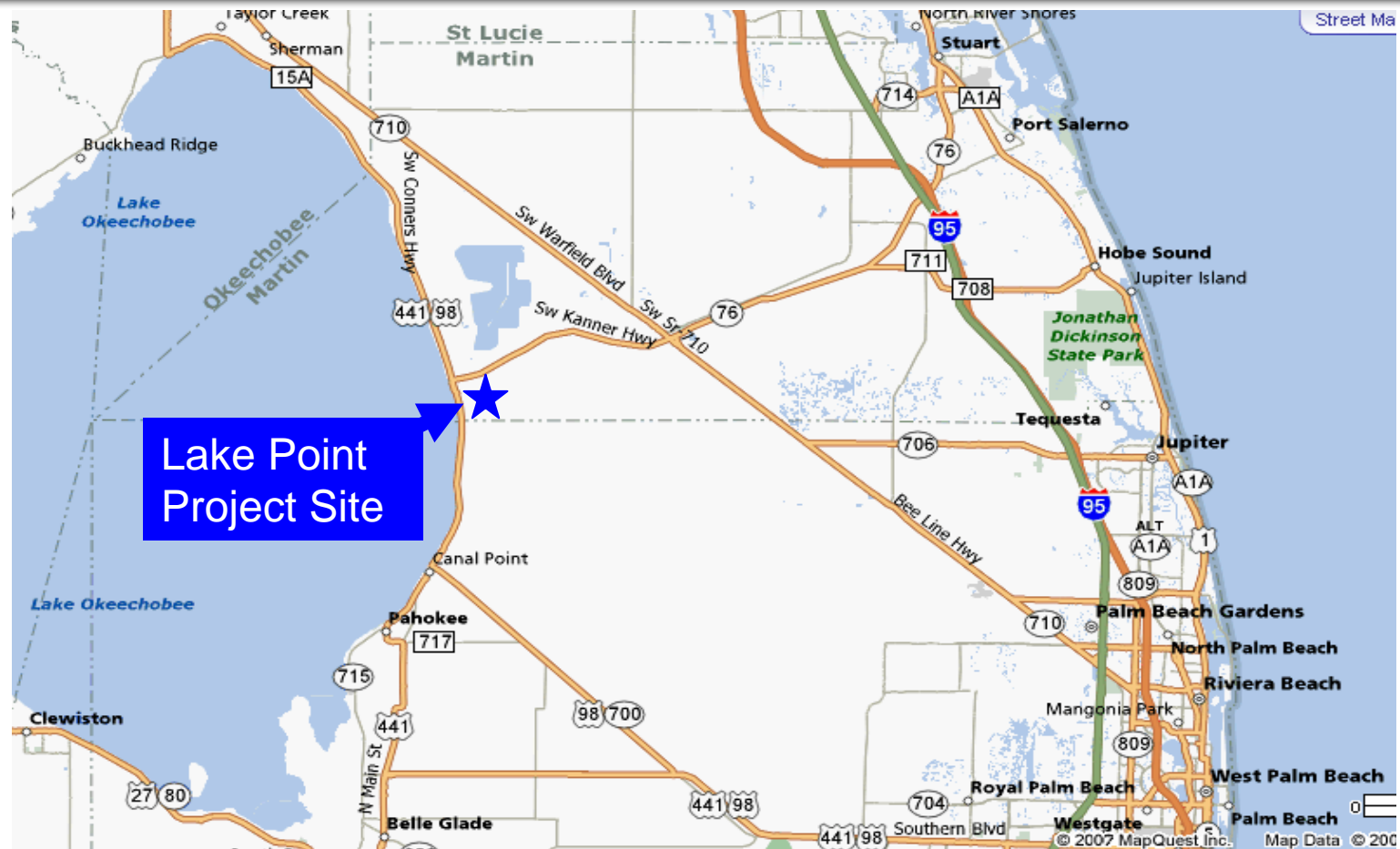




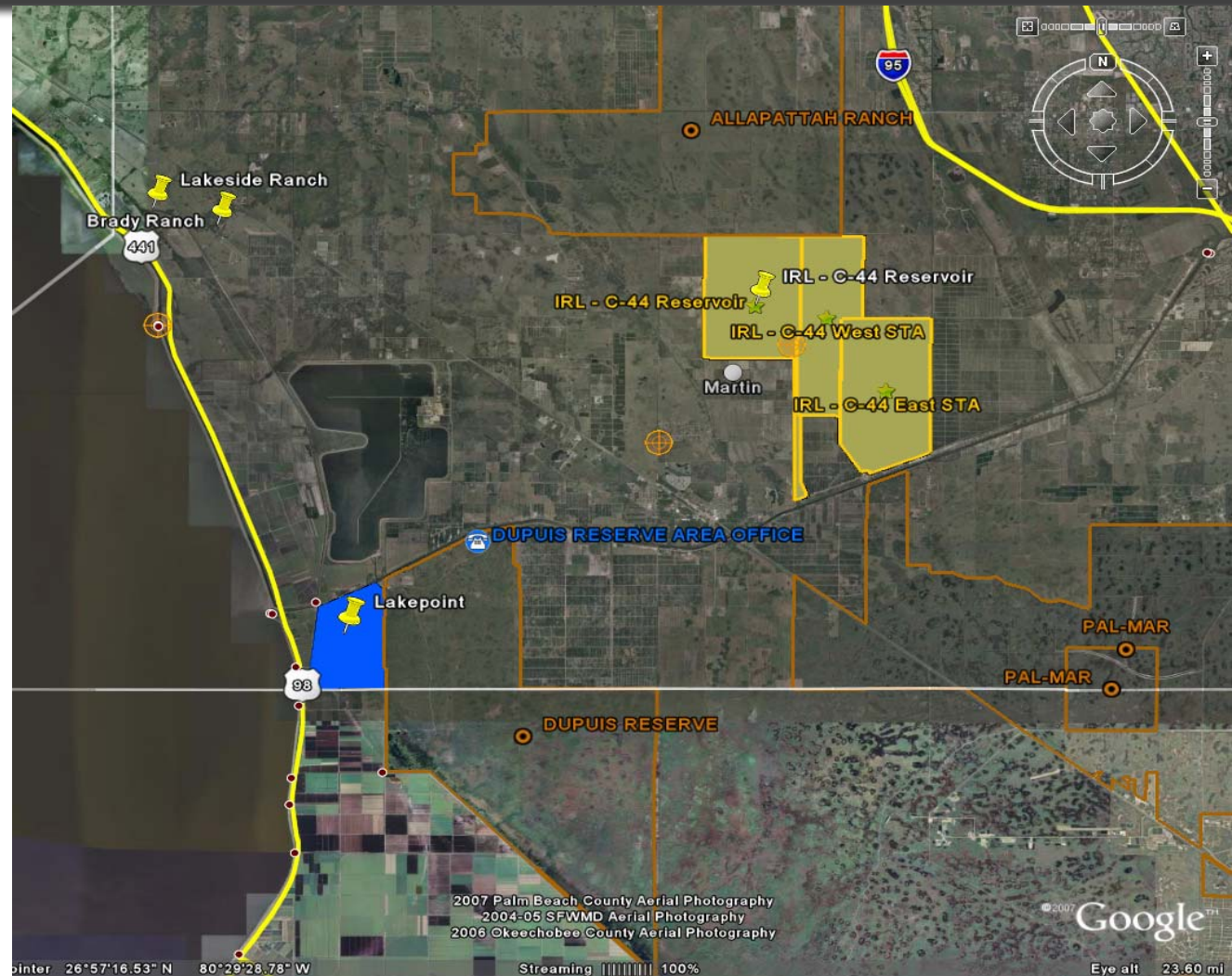
Lake Point

Stormwater Management Lake and Treatment Project

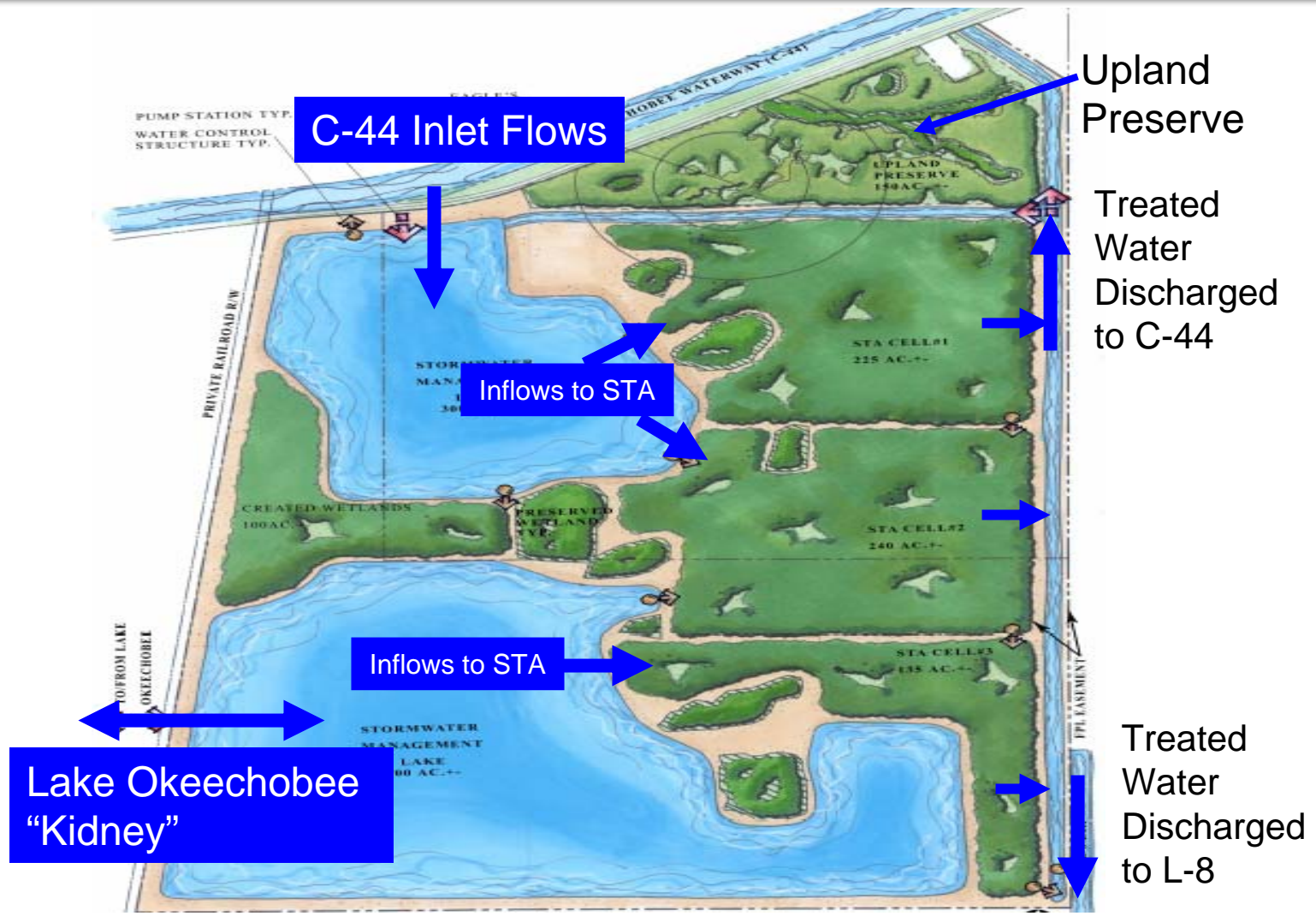
Jeffrey R. Kivett, P.E.
Everglades Restoration Engineering Director



Lake Point



Lake Point Site Plan



Lake Point Investigation – Part 1

- Is the site suitable for a stormwater management lake and stormwater treatment area?
- Will there be Groundwater impacts?



Preliminary Seepage Analysis

- BCI Engineers & Scientist performed a preliminary seepage analysis in June 2008
- Subsurface investigation inclusive of soil borings, in situ constant head pump test and piezometers were utilized to determine permeability of the soil.
- Site layered with organic material, sand, clayey sand, limerock and sand/w shell.
- Utilized SEEP/W to evaluate seepage analysis from the Stormwater Management Lake and Treatment Areas



Preliminary Seepage Analysis

- **Geologic conditions are consistent with surrounding area and comparable to District sites in the area**
 - **Lakeside Ranch**
 - **Brady Ranch**
 - **C-44 Reservoir/STA**
- **Seepage rates and permeabilities utilized in seepage modeling are consistent with geology**
- **Results from the investigation returned seepage rates that were consistent with the nearby Lakeside Ranch and C-44 projects.**



Stormwater Management Lake

- Stormwater Management Lake is 1,000 acres in size excavated to 20' deep
- Utilizes lake for short term storage 3-4 feet in depth of stormwater
- Seepage is captured and returned to Lake or Stormwater Treatment Area
- Stormwater captured during event is discharged to Stormwater Treatment Area for treatment.

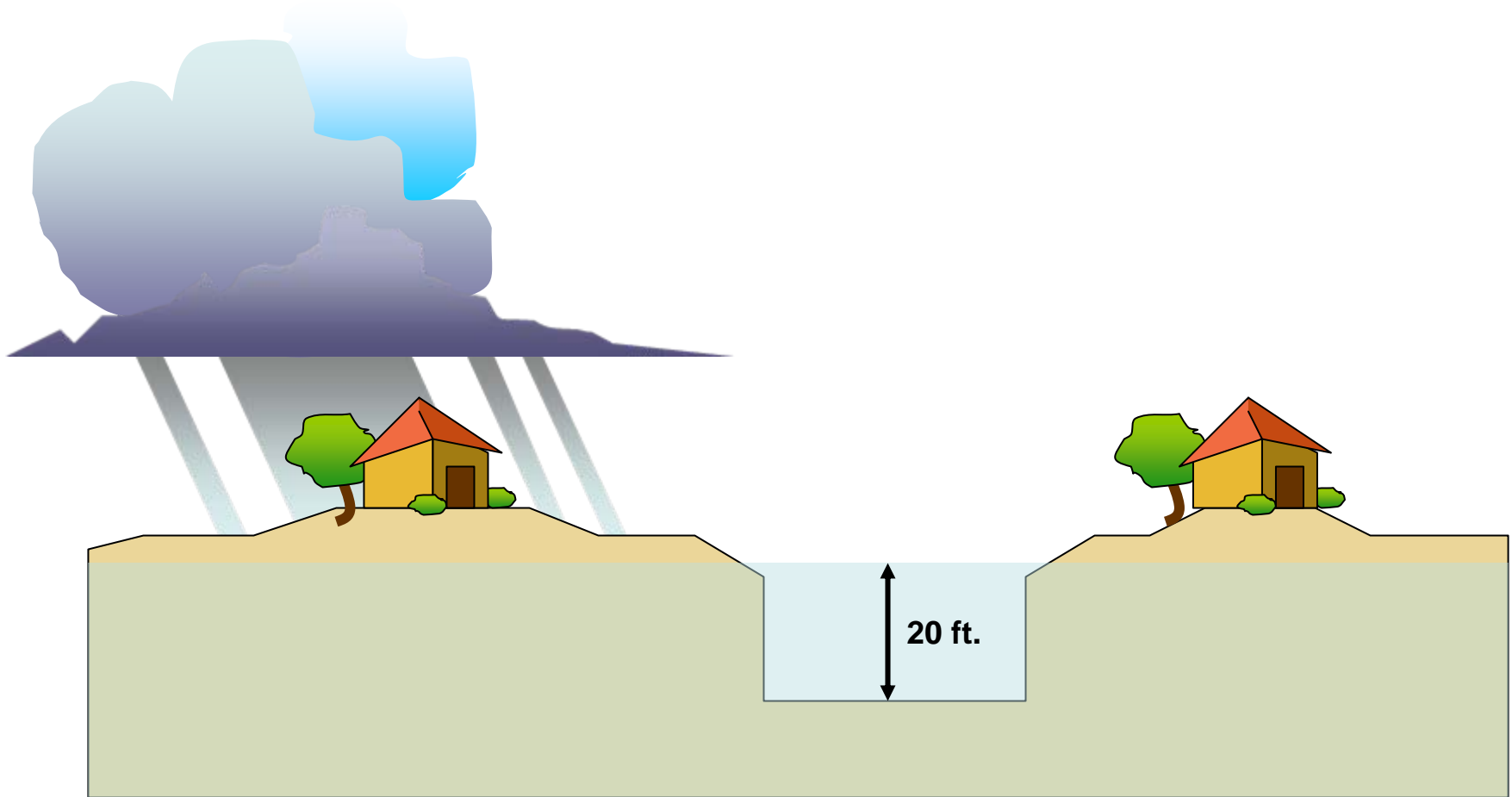


Stormwater Treatment Areas

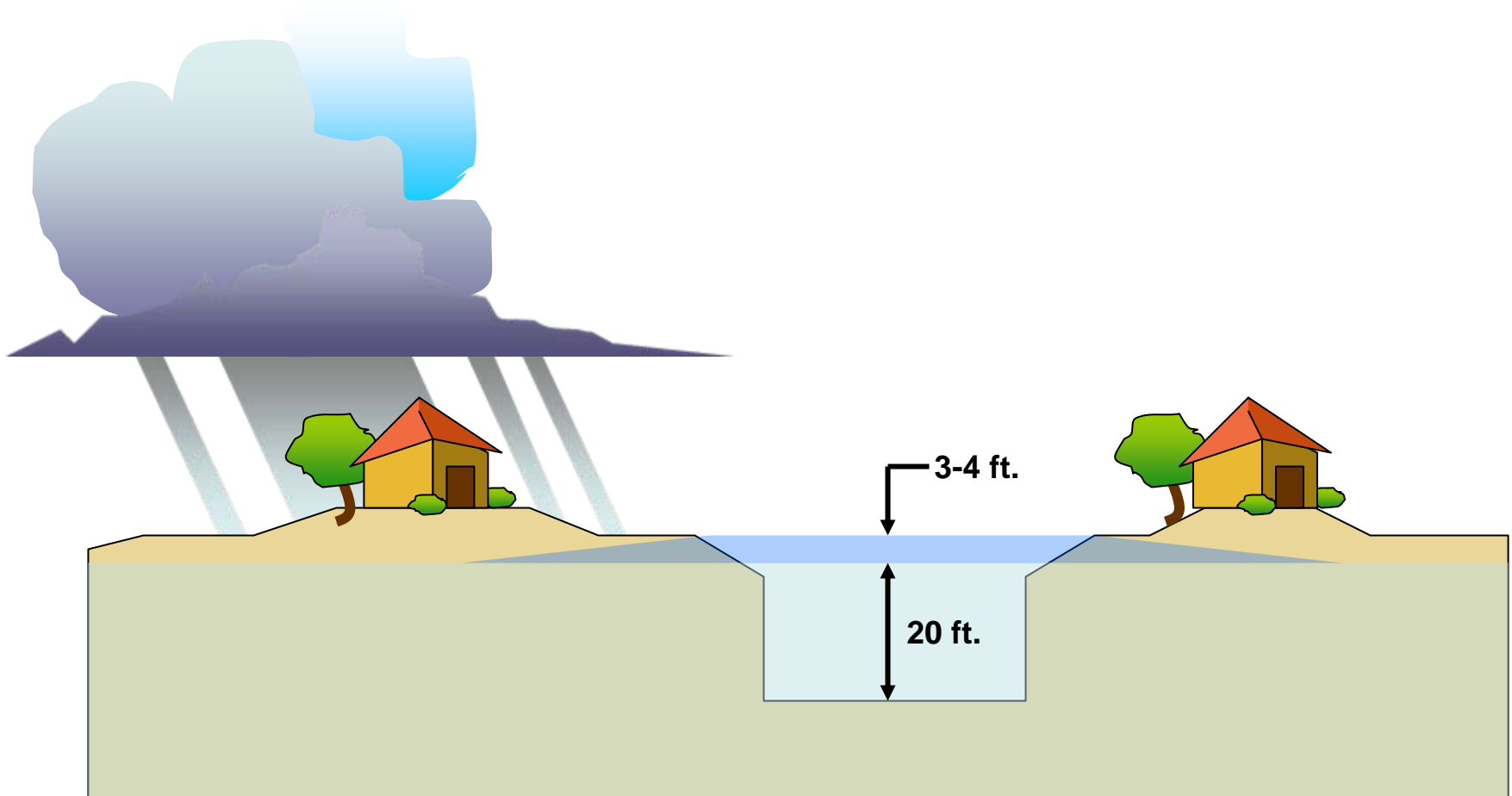
- Designed to hold up to 3' of water above grade for treatment
- Utilizes a seepage management canal around perimeter for seepage control
- Seepage water is returned to stormwater treatment area or placed back into the system



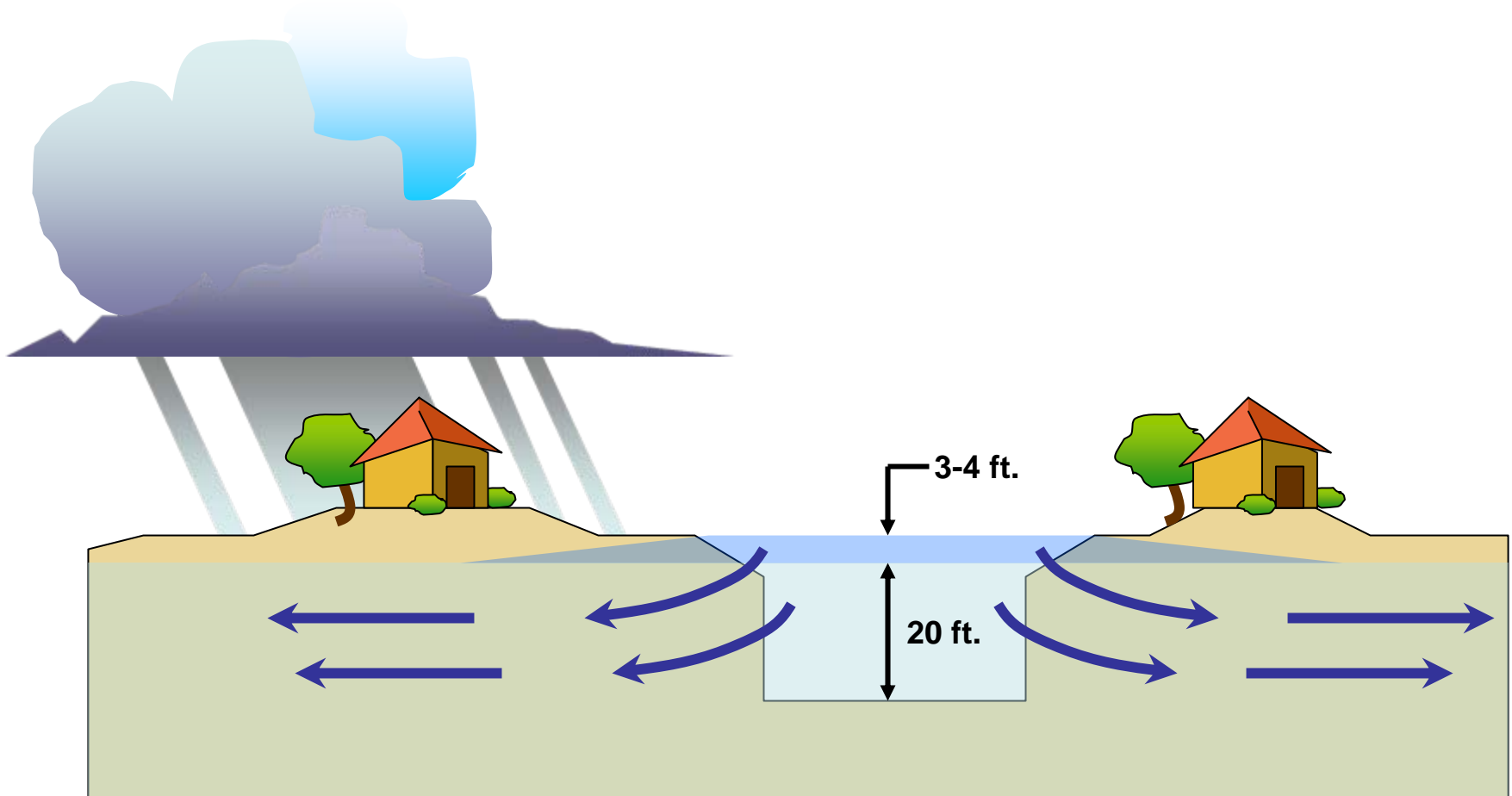
Typical Residential Stormwater System



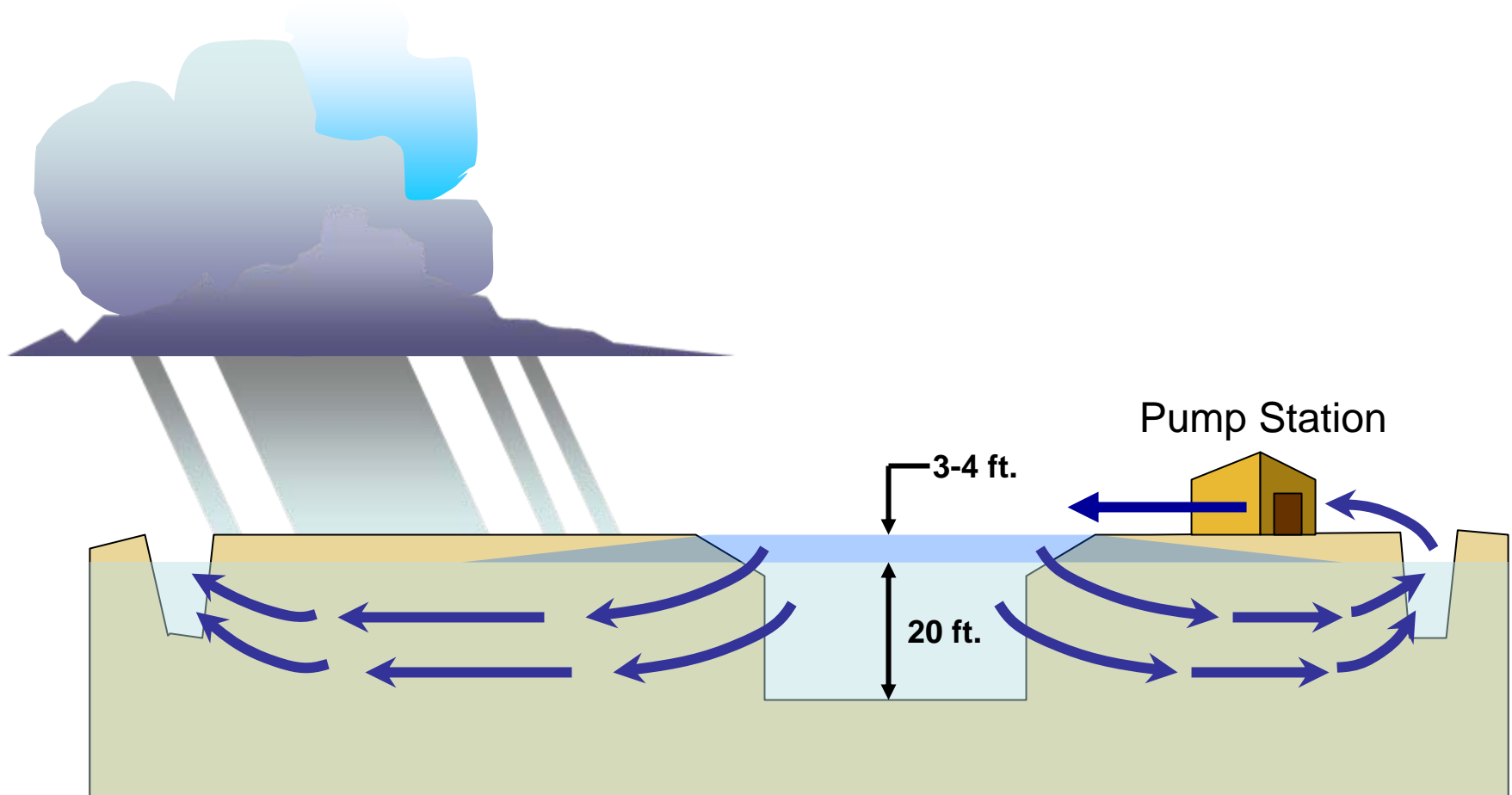
Typical Residential Stormwater System



Typical Residential Stormwater System



Generalized Water Management System



Lake Point Investigation – Part 2

- Will the project provide economical benefits in treating Stormwater runoff?



Water Quality Improvements

- Performed water quality analysis with varying phosphorous concentrations
 - (97.5, 150, 360 ppb inflow phosphorous concentrations)
- Compared vegetation types
 - Emergent vs. Submerged Aquatic Vegetation
- Results indicate treatment capacity for Lake Point System is between 190 and 345 cfs
- Utilized the 190 cfs for water budget modeling



Water Quality Improvements

Lake Point System with emergent vegetation has potential for reductions of phosphorous in the range of 2.5 to 6.2 metric tons/year

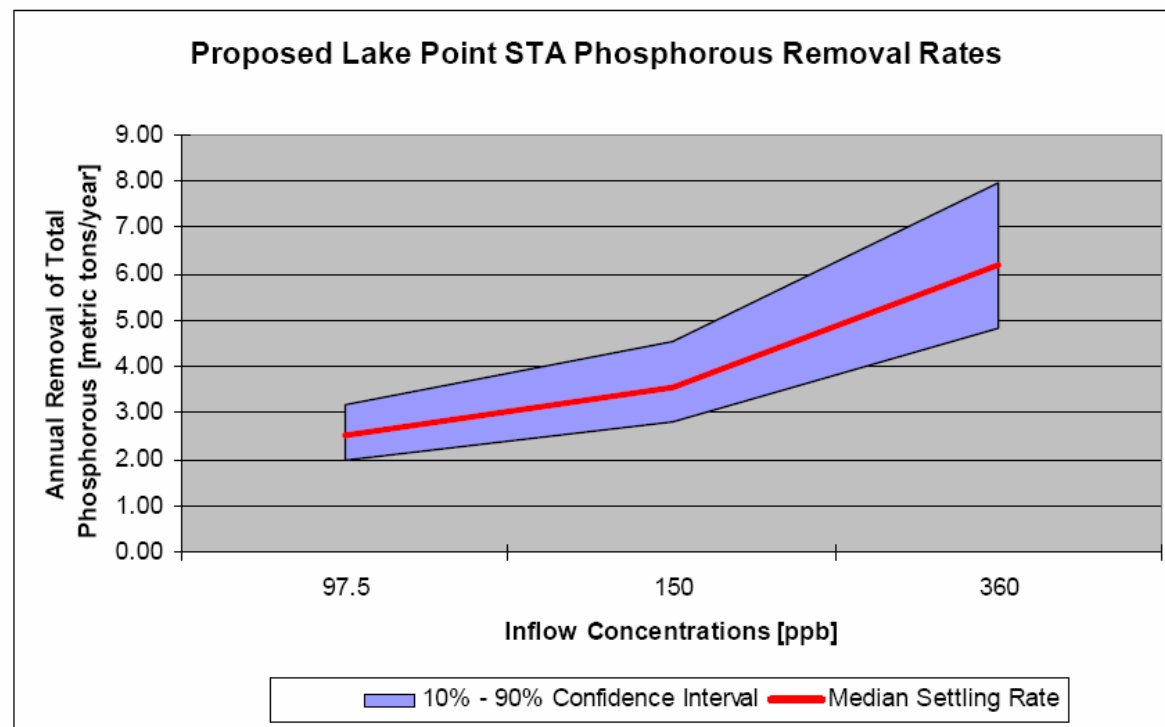


Figure 9. P Removal, metric tons/year

Project Cost

- Estimated cost of constructing a 3' deep Stormwater Management Lake is estimated at \$18.3 million (excludes cost for the 20' deep excavation)
- Estimated cost of constructing Stormwater Treatment Area is \$12.1 million
- Total cost of the stormwater management system for the project is estimated to be \$30.4 million
 - Developer to perform all earthwork (approximately \$17.4 million)
 - SFWMD to construct Structures and pump stations (approximately \$7 million for the STA and \$6 million upon completion of the Stormwater Management Lake)
- All cost in 2008 dollars



Cost of Stormwater Treatment Area

- Utilize 30 years of operation at 2.5 to 6 metric tons per year.

	2.5 metric tons/year	6 metric tons/year
Stormwater Treatment Area	\$161,000 per metric ton	\$67,000 per metric ton
District cost (approximately 50%)	\$80,500 per metric ton	\$33,500 per metric ton

- Lakeside Ranch – \$191,000 per metric ton



Lake Point Investigation - Part 3

- Is there water available requiring treatment?



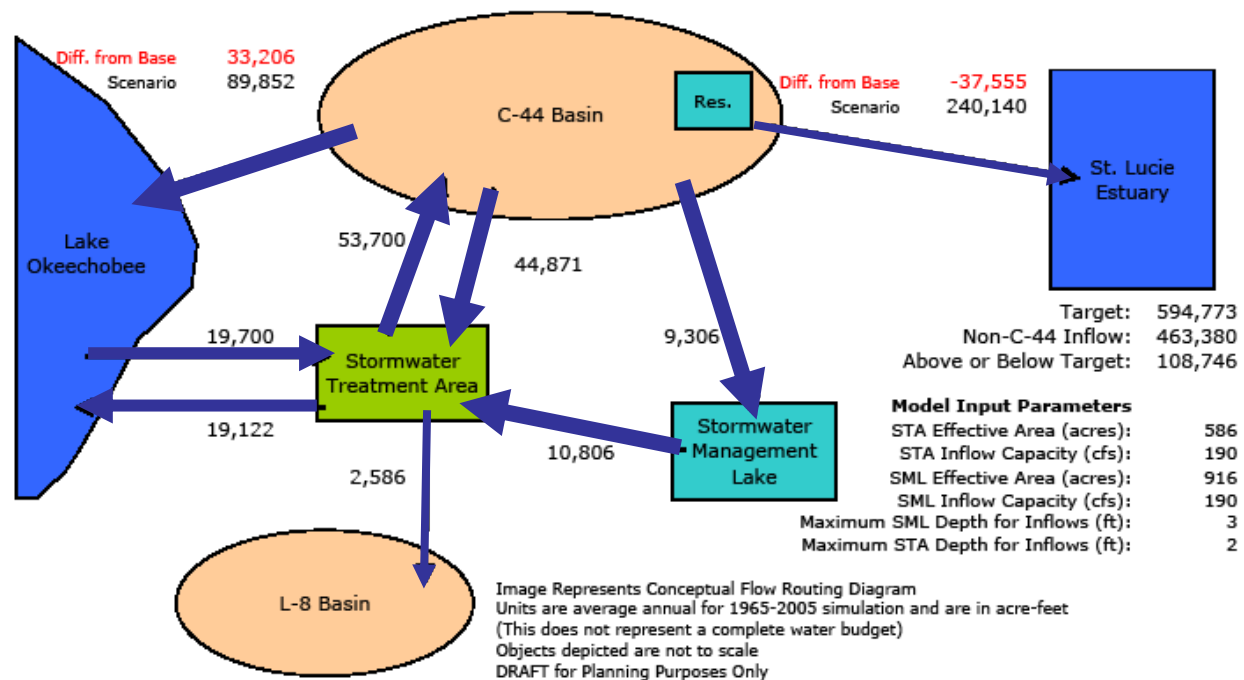
Water Budget Analysis

- **Performed water budget analysis for varying conditions:**
 - **Assumed C-44 Reservoir / STA was in place and fully functioning**
 - **Inflows pulled from the C-44 canal**
 - **Function as a “kidney” for Lake Okeechobee**
 - **Ability to direct excess flows to the L-8 basin**



Lake Point Water Budget – Modeling

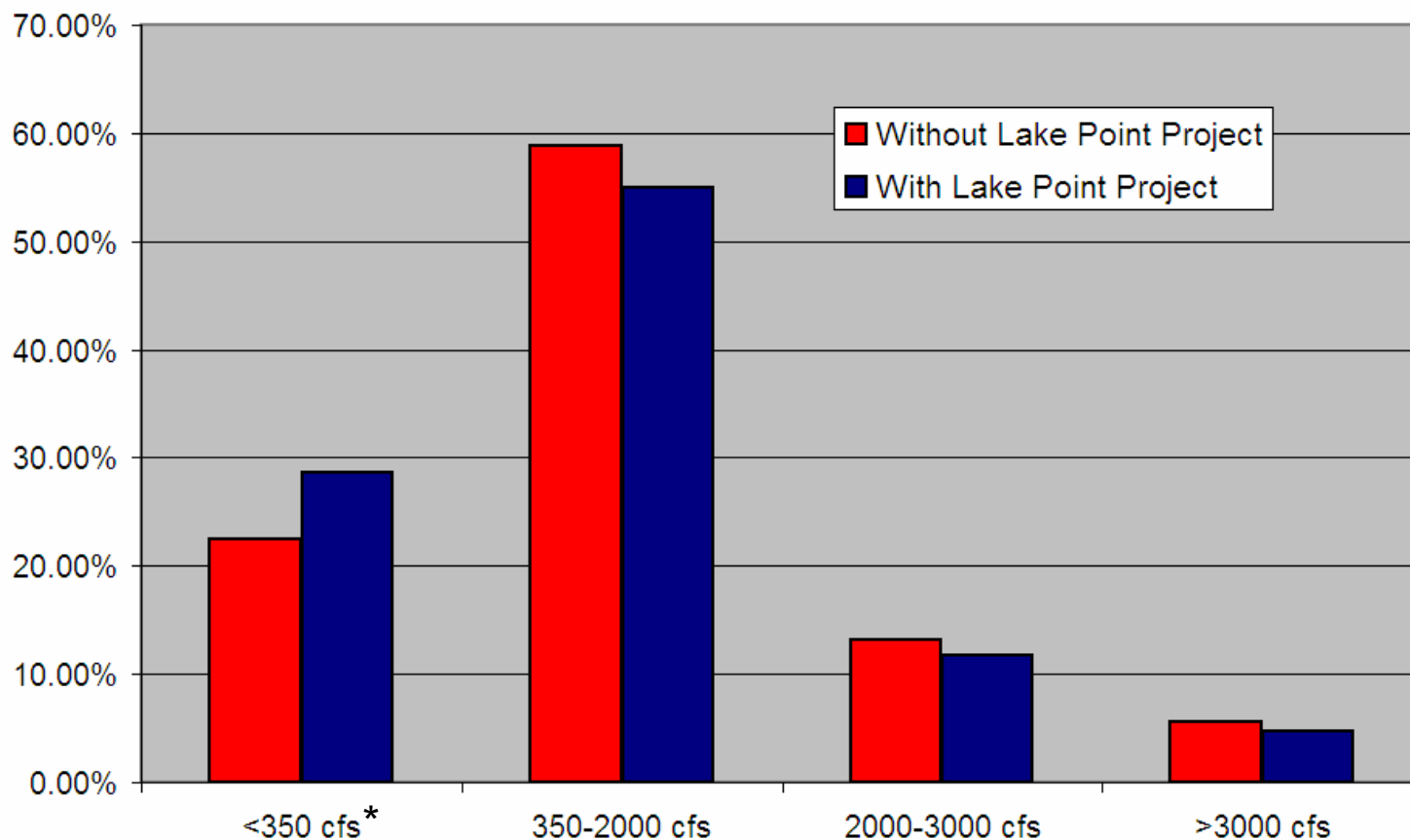
Future with C-44 Reservoir and IRL with Lake Point STA and SML
with Direct Treatment of Lake Okeechobee Water



Water Budget Results



Inflow Distribution to St Lucie Estuary




*Model does not account for groundwater flows to the estuary, thus alleviating the need for additional surface water deliveries.

Water Budget Results (acre-feet)



	Estuary Target Surplus	Reduction in Surplus Flows to Estuary	L-8 Basin Delivery	Lake Okeechobee “kidney”
C-44 and no Lake Point	146,301	0%	0	0
C-44 and Lake Point STA	116,349	20%	2,379	0
C-44 and Lake Point STA/SML	108,515	25%	2,858	0
C-44 and Lake Point STA/SML and Lake O “kidney”	108,746	25%	2,586	19,122

Water Budget Results

- 
- **St. Lucie Estuary**
 - C-44 Reservoir / STA reduces local basin run-off to the estuary by 65%
 - Lake Point reduces post C-44 Reservoir/STA surplus Estuary flows by 20-25%
 - C-44 Reservoir / STA and Lake Point System reduces local basin run-off to the estuary by 72-74%
 - Lake Point shifts St. Lucie flows toward the preferred flow range with modest reductions in peak flows to the estuary
 - **L – 8 Basin**
 - Indicates potential benefits to L-8 total demands
 - Provides operational flexibility and redundancy for competing L-8 demands
 - Operational protocol to be defined through detailed planning and design upon approval of the project by the District and Martin County

Conclusion

- **Strategic location allows local and regional benefits**
 - **Provides additional benefits to the Indian River Lagoon above the Indian River Lagoon Plan**
 - **Provides Benefit to Lake Okeechobee**
 - **Potential for additional benefits to the L-8 Basin**
- **Cost is competitive with Developer expected to cover over 50% of cost (earthworks)**
- **Land is protected with development of an Upland Preserve, Stormwater Management Lake and Stormwater Treatment Areas.**





■ Questions?